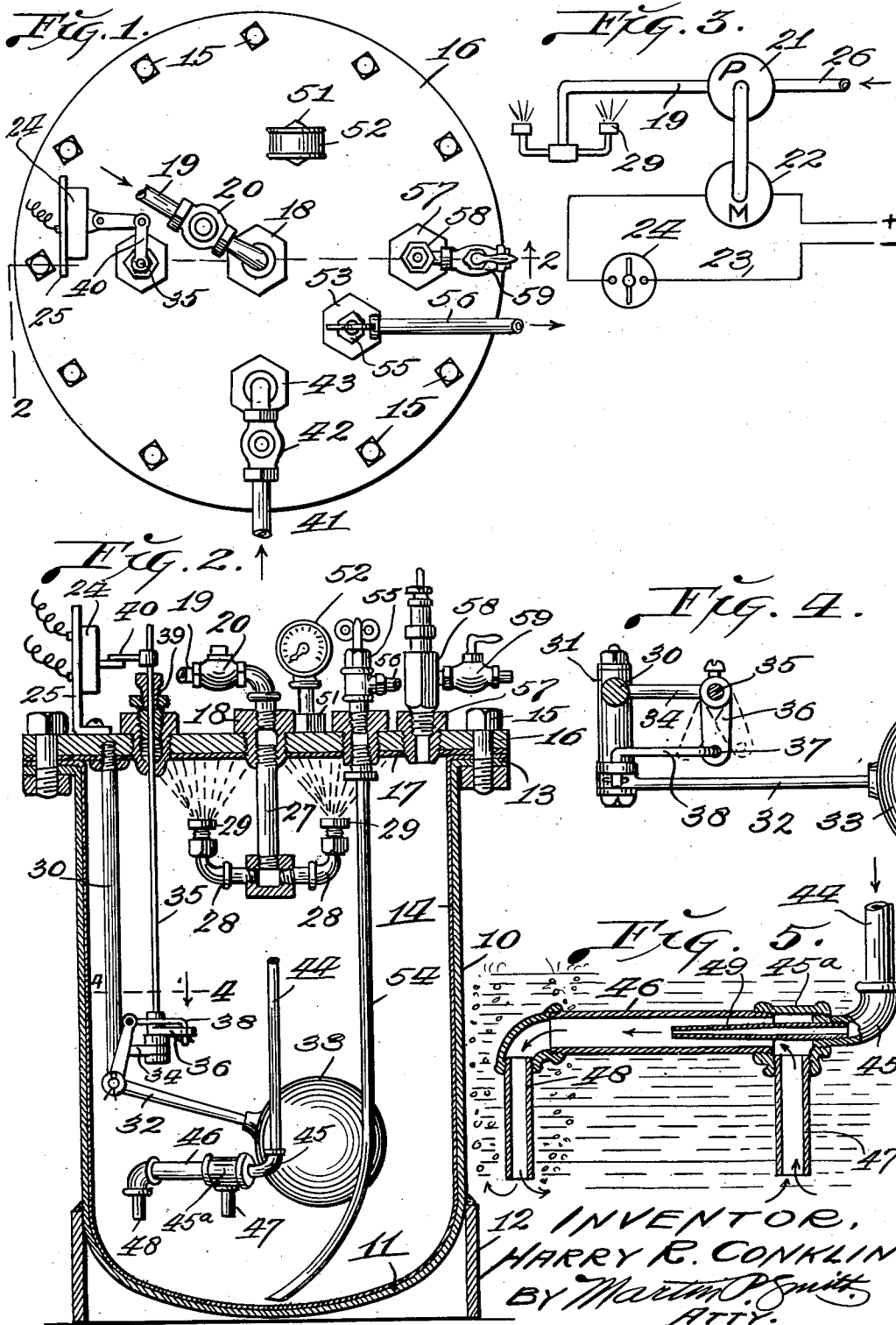


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AUTOMATIC CARBONATOR

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5 Claims. (Cl. 261-115)

My invention relates to a carbonator especially designed for carbonating liquids that are prepared and served as beverages in cafes, soda fountains and the like and the principal objects of my invention are, to provide a carbonator that is relatively simple in construction, inexpensive of manufacture, entirely automatic in operation and which is compact in structure so as to occupy comparatively little space when installed for use.

A further object of my invention is, to provide a carbonator that includes two main parts, a tank and a head or cover plate therefor, which latter may be easily and quickly applied to or removed from the tank and carries on its outer face the switch that controls the water pump driving motor, a pressure gauge, the water inlet from the pump and a safety blow-off valve and the under face of the removable cover carrying all of those parts that are contained within the tank, for instance, the water spraying means, the carbonated liquid draw-off duct, the agitator and the float that controls the operation of the motor circuit control switch. Thus the removal of the head or cover from the tank renders immediately available all mechanical parts of the carbonator with the exception of the pump unit which is separately connected to a driving motor and is connected to the carbonator tank by a pipe.

Such construction enables the carbonator tank to be lined with a solid one-piece liner of tin which may be easily spun to proper shape and inserted into the tank without necessitating the soldering of a number of joints as usually required in the lining of the tank.

The cover plate carries on its under side a flat sheet of tin lining to which the lower ends of the bushings that pass through the cover plate may be readily soldered to produce fluid pressure tight joints and thus the re-lining of the carbonator tank may be very expeditiously and economically accomplished.

Further objects of my invention are, to provide a carbonator of the character referred to wherein the CO₂ gas is introduced into the liquid in the lower portion of the tank through an ejector, thus providing an agitator that effects a thorough mixing of the inflowing gas with the water or other liquid and at the same time thoroughly circulating the latter and further, to introduce the water or other liquid into the upper portion of the tank by means of mist spray nozzles with the result that the water in the form of mist immediately absorbs the gas that has bubbled upwardly through the liquid in the lower

portion of the tank and passed into the upper portion of the chamber of said tank.

A further object of my invention is, to provide a carbonator wherein the liquid level within the tank is controlled by an inside float that actuates an electric switch on top of the tank and which switch controls the operation of the pump actuating motor.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts that will be hereinafter more fully described and claimed and illustrated in the accompanying drawing in which:

Fig. 1 is a top plan view of a carbonator constructed in accordance with my invention.

Fig. 2 is a vertical cross section taken on the line 2-2 of Fig. 1.

Fig. 3 is a diagrammatical view including the pump operating motor, the circuit in which said motor is located and the switch that controls said circuit.

Fig. 4 is an enlarged horizontal section taken on the line 4-4 of Fig. 2.

Fig. 5 is a vertical longitudinal section of the agitator that includes an ejector tube carried by the discharge end of the gas inlet duct.

Referring by numerals to the accompanying drawing which illustrates a preferred embodiment of my invention, 10 designates a tank preferably pressed from suitable sheet metal and having an ellipsoidal bottom 11 and suitably secured to the lower end of said tank is a base ring 12. Projecting outwardly from the upper end of the tank body is a flange 13 and overlying said flange and the entire inner face of the tank body is a lining 14 of tin which may be conveniently shaped by spinning or otherwise and inserted in the body without the necessity for soldering operations.

Positioned on top of the tank and detachably secured thereto by means of cap screws or bolts 15 is a cover plate or head 16, the under side of which is faced with a lining sheet 17 of tin.

Seated in the central portion of the cover plate is a bushing 18 to which is suitably connected a duct 19 that conveys the water or other liquid, that is to be carbonated, to the tank and located in this duct is a conventional check valve 20. Pipe 19 leads from a pump 21, preferably driven by an electric motor 22 and located in the motor circuit 23 is a suitable switch 24 of a type readily obtainable in the open market. This switch is preferably located on a bracket 25 that is secured on top of cover plate 16. A duct, preferably a 55

pipe 26 leads from a suitable source of water or liquid supply to pump 21.

Secured to and depending from the lower end of bushing 18 is a short pipe 27, to the lower end of which is suitably connected a plurality of fittings 28, each of which includes a mist spray nozzle 29 that is positioned so as to discharge spray in mist form upwardly against the under side of the cover plate.

Rigidly secured to cover plate 16 and depending therefrom is a rod 30, the lower end of which carries a short cross arm 31 and mounted to swing on the end of said cross arm is a bell crank 32, the end of the long arm of which carries a float 33. Secured to and projecting from the lower portion of rod 30 and disposed at right angles to the cross member 31, is an arm 34 that provides a bearing for the lower end of a vertically disposed rod 35, the latter occupying a position parallel with rod 30.

Secured to the lower portion of rod 35 is a short crank arm 36 provided with an aperture 37 and pivotally engaged in said aperture, is one end of a link 38, the other end being pivotally connected to the short arm of bell crank 32 and which short arm projects upwardly at right angles to the long arm of said bell crank. As a result of the construction just described, rod 35 will be partially rotated as the float 33 moves upwardly and downwardly with the rise and fall of the level of the carbonated liquid within the tank.

Rod 35 passes through a stuffing box 39 that is seated in cover plate 16 and mounted on the upper portion of said rod above said stuffing box, is a crank arm 40 that is adapted to engage and operate the switch 24.

The means for admitting CO₂ gas or the like to the tank includes a duct, such as a pipe 41 in which is located a conventional check valve 42 and this pipe is connected to a bushing 43 that is seated in the cover plate 16. Secured to and depending from bushing 43 is a pipe 44, to the lower end of which connected an elbow 45, preferably a street L, and the latter being connected to one end of a T 45a, that is seated in one end of a short horizontally disposed pipe 46, that is located in the lower portion of the tank 10. Suitably connected to and depending from pipe 46 adjacent the L 45, is a short vertically disposed tube 47 open at both ends and a similar tube 48 is connected to and depends from the other end of pipe 46.

Seated in the end of the elbow or street L 45 that connects to the T 45a, is an ejector nozzle 49, the end of which terminates in the intermediate portion of pipe 46 between the depending pipes 47 and 48. (see Fig. 5).

Duct 41 leads and is suitably connected to a source of CO₂ gas, for instance, a conventional tank or container.

A pressure gauge 52 is seated in a bushing 51 which is seated in cover plate 16.

The means for drawing off carbonated liquid from the tank includes a bushing 53 that is seated in cover plate 16 and connected to and depending from said bushing is a tube 54, the open lower end of which terminates at or near the bottom of tank 10. Connected to the external portion of bushing 53, is the lower end of a manually operable valve 55 and leading therefrom is a duct 56, preferably a pipe, that leads to the point where the carbonated liquid is used. Seated in cover plate 16 is a bushing 57 to which is connected a conventional safety blow-off valve 58 and a drain cock 59.

The operation of my improved carbonator is as follows:

Assuming that the level of the carbonated liquid within the tank is low and that the float 33 occupies a position substantially as shown in Fig. 2, switch 24 is closed due to the position of the float and the connections between said float and rod 35 and, under such conditions motor 22 drives pump 21 to force liquid from supply pipe 26 through pipes 19 and 27 to the spray nozzles 29, so that spray in mist form is discharged upwardly through the upper portion of the chamber within the tank. CO₂ gas or the like is permitted to discharge through pipe 41 past check valve 42 and thence through pipe 44 and the gas in jet form discharges from the ejector nozzle 49 into the intermediate portion of pipe 46. Inasmuch as pipes 47 and 48 are wholly submerged in the liquid in the lower portion of the tank, the discharge of gas from the ejector nozzle functions to draw liquid upwardly through pipe 47 and such liquid is discharged with the jet of gas downwardly through pipe 48, thus effecting a thorough mixture of the gas with the liquid and producing agitation within the body of liquid contained within the tank. The excess of gas that is not absorbed by the liquid, will bubble upwardly through the liquid from the lower end of pipe 48 and this gas passes to the upper portion of the chamber within the tank where it is absorbed by the water or other liquid that issues in spray mist form from the jet nozzles 29, thus effecting complete carbonating of the liquid.

As the level of the carbonated liquid rises in the lower portion of the tank, float 33 will move upward and through connections 38 and 36, shaft 35 will be rotated so as to swing arm 40 to a position to cause switch 24 to open, thus opening the motor circuit which brings about cessation of operation of the pump and consequently cutting off further delivery of water or other liquid to be carbonated to the tank. The carbonated liquid is withdrawn from the tank through pipe 54 by opening valve 55 and the use of the pressure gauge 52 enables the pressure within the tank to be observed at all times. The drain cock 59 enables the air to be discharged from the upper portion of the tank before beginning carbonating operations.

All of the parts and fittings within the tank should be formed of stainless steel, silver-plated or carefully tinned.

Thus, it will be seen that I have provided an automatic carbonator that is relatively simple in construction, inexpensive of manufacture and very effective in performing the functions for which it is intended.

Among the especially desirable features of my invention are, the mounting of all operating parts and fittings upon the cover plate so that the removal of the latter from the tank immediately makes available, all mechanical parts of the apparatus other than the pump unit which is separately hooked up to the motor and is connected to the tank by a single pipe. Further, the provision of the agitator and the mist spray nozzles are effective in bringing about a thorough mixture of the gas with the water or other liquid and the level of the carbonated liquid is controlled by the float located within the tank.

It will be understood that minor changes in the size, form and construction of the various parts of my improved automatic carbonator, may be made and substituted for those herein shown and described, without departing from the spirit 75

of my invention, the scope of which is set forth in the appended claims.

I claim as my invention:

5 1. In a carbonator, the combination with a pump, a motor for driving said pump and the circuit in which said motor is located, of a tank, a cover plate removably mounted on said tank, a duct leading from the pump through said cover plate, spray nozzles connected to said duct within
10 the tank, means carried by the cover plate for admitting gas to the tank, a switch located in the motor circuit and mounted on said cover plate and means actuated by the liquid level within the tank for actuating said switch.

15 2. In a carbonator, the combination with a pump, a motor for driving said pump and the circuit in which said motor is located, of a tank, a cover plate removably mounted on said tank, a duct leading from the pump through said cover
20 plate, spray nozzles connected to said duct within the tank, means carried by the cover plate for admitting gas to the tank, means carried by the gas admission means for effecting agitation of the liquid within the tank, a switch located in
25 the motor circuit and mounted on said cover plate and a float actuated by the liquid level within the tank for actuating said switch.

3. In a carbonator, a tank, a cover plate removably mounted on said tank, a duct carried by said cover plate for admitting liquid to be carbonated into said tank, float actuated means for
30 controlling the admission of liquid to said tank,

means for causing the admitted liquid to discharge in spray form upwardly into the upper portion of the chamber within the tank, a duct carried by the removable cover plate for conveying gas into the tank and means carried by said
5 gas admission means and located within the tank below the normal level of the liquid therein for utilizing the admitted gas to effect an agitation of the liquid contained within the tank.

4. In a carbonator, the combination with a
10 tank, of means for admitting and spraying liquid under pressure into said tank, a gas actuated agitator for admitting gas into the tank, a float within said tank for controlling the admission of liquid into the tank, a removable cover plate for
15 said tank, which cover plate carries the liquid supplying and spraying means, the gas actuated agitator and said float; and means for withdrawing carbonated liquid from the tank.

5. In a carbonator, the combination with a
20 tank, of means for admitting and spraying liquid under pressure into said tank, a gas actuated agitator for admitting gas into the tank, a float within said tank for controlling the admission of liquid into the tank, a removable cover plate for
25 said tank, which cover plate carries the liquid supplying and spraying means, the gas actuated agitator and said float; a removable spun tin lining for said tank and means for withdrawing carbonated liquid from the tank.

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